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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/720,554	12/27/2000	Ayako Hohsaka	HOHSAKA-2	2522

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624 Ninth Street NW
Washington, DC 20001-5303

EXAMINER

ANGEBRANNDT, MARTIN J

ART UNIT	PAPER NUMBER
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1756

DATE MAILED: 06/09/2003

12

Please find below and/or attached an Office communication concerning this application or proceeding.

AS-12

Office Action Summary

Application N .

09/720,554

Applicant(s)

HOHSAKA ET AL.

Examiner

Martin J Angebranndt

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 March 2003 and 07 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6,8,9 and 12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6,8,9 and 12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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1. The response provided by the applicant has been read and given careful consideration.

Responses to the arguments appear after the first rejection to which they are directed and in the advisory action of 4/1/2003. Claims 7, 10 and 11 have been cancelled. The applicant should take care to insert the chemical structure when amending the claims. The examiner corrected claim 1 as an obvious error based upon the previous presentation of that claim.

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-6, 8, 9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inagaki et al. '281, in view of Sato et al. '839.

Inagaki et al. '281 teach the use of compounds embraced by the formula (1), which includes linking groups such as those of formula (b) in column 3. The substituents Y may be hydrogen, alkyl groups, and halogens. (4/21-32). Benzoindoleneic terminal moieties are taught as evidenced by compounds 14 and 15 in columns 7 and 8. The use of the PF_6^- anion is disclosed as resulting in increased stability, has good solubility and is free from the danger of explosion. (1/65-2/4). The dyes disclosed are all symmetric.

Sato et al. '839 teaches the use of compounds embraced by formula (I), where the benzene nuclei may be condensed with one or more benzene rings or may be substituted by various moieties. (3/18-24) the number of methine groups is 5 when n is 2 (2/64). The anions may be any acid anions including halogens, and SbF_6^- . (2/65-67). The N-alkyl groups are

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different with R_5 being a C_{1-3} alkyl group and R_6 being a C_{3-18} alkyl group. This asymmetry is disclosed as improving the stability, solubility and the like. (4/20-30 and 2/10-15). The equivalence in the various terminal moieties is found in 3/24-25. The equivalence of heptamethine and pentamethine chains based upon the disclosure of n being equal to 2 or 3 (2/65). The equivalence in the various anions is found in 2/65-67.

It would have been obvious to one skilled in the art to modify the symmetric pentamethine benzoindolenic dye having a PF_6^- anion as the counterion, such as compounds 14 and 15 of Inagaki et al. '281 by adding a halogen as the substituent at the meso position of the pentamethine chain shown in general formula b in column 3 of Inagaki et al. '281 based upon the disclosure of equivalence within Inagaki et al. '281 and by using different N-substituents on the benzoindolenic moieties based upon the teachings of Sato et al. '839 with a reasonable expectation of achieving the increases in solubility, stability and the like as this is attributed to the asymmetry in the N-substituents

While there is not data, the solubility benefit is attributed in the Sato et al. reference to the asymmetry. Even merely being more soluble than equivalent compounds with the same N-substituents would be sufficiently desirable. The examiner notes that there is comparative data establishing improved stability. The applicant's reasons for using the hexafluorophosphoric acid anions (page 3 at lines 2-7) are the same as those taught in Inagaki et al. '281 and Saito et al. '089. The solubility disclosed by Sato et al. '839 is the same issue as discussed in the instant specification on page 9 at lines 1-7 as well as on pages 29-31 with respect to table 2. **Therefore the desired results (increased stability and solubility; increased resistance to fading of the dye due to heat or light, increased writing sensitivity and high C/N values, increased**

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stability, has good solubility and is free from the danger of explosion) and the same means as disclosed in the instant application (different N substituents and the use of PF₆ as the anion) for achieving them are already appreciated in the prior art and therefore cannot be interpreted as unexpected.

4 Claims 1-6,8,9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inagaki et al. '281, in view of Sato et al. '839, further in view of Hamer, F.M., "The Cyanine Dyes and Related Compounds" (1964) pp. 200-243 and Dickerson et al. '447.

Hamer, F.M., "The Cyanine Dyes and Related Compounds" (1964) pp. 200-243 teaches various methods for making unsymmetrical cyanine dyes including that describing the reaction of compound (II) on page 201 with quaternary salts of heterocyclic moieties having a reactive methyl group. (201-202). Pentamethine dyes disclosed as being formed in 1930 are disclosed as being meso substituted and therefore are easier to make. (page 200) These include bromo-meso and chloro-meso dyes (page 201).

Dickerson et al. '447 teaches that with pantamethine cyanine dyes, meso substitution is disclosed as promoting aggregation (12/2-8)

In addition to the basis provided above, the examiner cites Hamer, F.M., "The Cyanine Dyes and Related Compounds" (1964) pp. 200-243 and Dickerson et al. '447 to establish that the substitution of the meso position of pentamethine cyanine dyes is old and well known and that it is recognized as promoting aggregation of the dyes and holds that this further supports the obviousness of the combination of Inagaki et al. '281, in view of Sato et al. '839 discussed above.

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5 Claims 1-6,8,9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morishima et al. '772, in view of Inagaki et al. '281 and/or Saito et al. '089 combined with Sato et al. '839.

Morishima et al. '772 teaches the use of cyanine dyes embraced by the formula (B-1) in column 26, where the linking group is a pentamethine linkage optionally substituted with alkyl or halogen moieties and the Z moieties may be naphthalene residues and the N-substituents may be the same or different. (26/11-21). The dyes B-3, B-14 and B-10, in example 7 is a symmetric pentamethine benzoindolenic dye having a PF_6^- anion as the counterion. The use of fluorine as the anion is also disclosed. (24/66). Dyes B-24, B-25


Saito et al. '089 teaches that the use of the PF_6^- anion as the counterion increases the thermal decomposition temperature of the cyanine dye relative to the perchlorate ion. (table 3, Col. 22). This translates to increased resistance to fading of the dye due to heat or light, increased writing sensitivity and high C/N values.

It would have been obvious to modify the dyes B-25 and B-26 of Morishima et al. '772 by using the PF_6^- anion as the counterion as taught by Inagaki et al. '281 and/or Saito et al. '089 with a reasonable expectation of improving the stability of the resultant medium with respect to heat and light based upon the teachings of Inagaki et al. '281 and/or Saito et al. '089 and using different different N-substituents on the benzoindolenic moieties based upon the teachings of Sato et al. '839 with a reasonable expectation of achieving the increases in solubility, stability and the like as this is attributed to the asymmetry in the N-substituents.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin J Angebranndt whose telephone number is 703-308-4397. The examiner can normally be reached on Mondays-Thursday and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 703-308-2464. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.



Martin J Angebranndt
Primary Examiner
Art Unit 1756

June 4, 2003